

CLAIMS:

1. A method of transmitting beacon messages between a plurality of radio nodes (205, 215) in an ad hoc or multihop network **characterised in** that the rate of which a first radio node transmits its beacons is based on an estimate of the network dynamics.
- 5 2. Beacon transmitting method according to claim 1, **further comprising** that the beacon transmit power at which the first radio node radio transmits its beacons is based on an estimate of the network dynamics.
3. Beacon transmitting method according to claims 1 or 2, **wherein** the estimate of the network dynamics is performed at least by the first radio node and based on a
10 plurality of beacons received from at least a second radio node by the first radio node.
4. Beacon transmitting method according to claim 3, **wherein** the estimate of the network dynamics is based on analysis of the relative speed of the at least the second radio node compared to the first radio node.
- 15 5. Beacon transmitting method according to claim 4, **wherein** the estimate of the network dynamics is based on analysis of the relative speed of a plurality of neighbouring radio node and wherein the neighbouring radio node that exhibit the highest relative speed compared to the first radio node, is given the greatest impact on the estimate of the network dynamics.
- 20 6. Beacon transmitting method according to any of claims 1 to 5, **wherein** at least the first radio node performs the steps of:
 - a) *-defining* a subset, NB_v , of neighbours (305);
 - b) *-recording* beacon message (310) from at least a second radio node which is part of the subset and *storing* beacon parameters of the respective beacon messages;
 - 25 c) *-estimating* the network dynamics (315), based on the beacon parameters of the beacon messages received from at least the second radio node in the subset;
 - d) *-determining* beacon rate (325), based on the estimate of the network dynamics.
7. Beacon transmitting method according to claim 6, **wherein** the method comprises a step, to be performed prior to the determining step d), of:
30 *-comparing* estimates of network dynamics (320), wherein if the current estimate of network dynamics differ with at least a predetermined amount from a previous

estimate of the network dynamics, the method proceeds to the determining step d), and otherwise the first the method continues to monitor the neighbouring radio nodes in the subset (steps a-c).

- 5 8. Beacon transmitting method according to claim 6, **wherein** the step of estimating the network dynamics, the estimate of the network dynamics is at least partly based on the path loss history of the beacons received from at least the second radio node in the subset.
- 10 9. Beacon transmitting method according to claim 6, **wherein** the beacon parameters comprise at least one parameter relating to received signal strength of the beacon message, and at least one parameter relating to time of arrival of the beacon messages.
10. Beacon transmitting method according to claim 9, **wherein**, the beacon parameters comprise parameters that have been included by the sending radio node in the beacon message.
- 15 11. Beacon transmitting method according to claim 10, **wherein**, at least one parameter originally included by the sending radio node comprises a parameters relating to the position of the sending node.
- 20 12. A method in a radio node (205) of transmitting beacon messages to at least a second radio node in an ad hoc or multihop network, wherein the ad hoc or multihop network comprises a plurality of radio nodes (205, 215), the method in the first radio node **characterised in** that the rate of which the first radio node transmits its beacons is based on an estimate of the network dynamics.
- 25 13. Beacon transmitting method according to claim 12, **wherein** the beacon transmit power at which the first radio node radio transmits its beacons is based on an estimate of the network dynamics.
14. Beacon transmitting method according to claims 12 or 13, **wherein** the estimate of the network dynamics is performed by the first radio node and based on a plurality of beacons received from at least a second radio node.

15. Beacon transmitting method according to claim 14, **wherein** the estimate of the network dynamics is based on analysis of the relative speed of the at least the second radio node compared to the first radio node.
- 5 16. Beacon transmitting method according to claim 15, **wherein** the estimate of the network dynamics is based on analysis of the relative speed of a plurality of neighbouring radio nodes and wherein the neighbouring radio node that exhibit the highest relative speed compared to the first radio node, is given the greatest impact on the estimate of the network dynamics.
- 10 17. Beacon transmitting method according to any of claims 12 to 17, **wherein** the first radio node performs the steps of:
a) *-defining* a subset, NB_v , of neighbours (305);
b) *-recording* beacon message (310) from at least a second radio node which is part of the subset and *storing* beacon parameters of the respective beacon messages;
15 c) *-estimating* the network dynamics (315), based on the beacon parameters of the beacon messages received from at least the second radio node in the subset;
d) *-determining* beacon rate (325), based on the estimate of the network dynamics.
- 20 18. Beacon transmitting method according to claim 17, **wherein** the method comprises a step, to be performed prior to the determining step d), of:
-comparing estimates of network dynamics (320), wherein if the current estimate of network dynamics differ with at least a predetermined amount from a previous estimate of the network dynamics, the method proceeds to the determining step d),
and otherwise the first the method continues to monitor the neighbouring radio nodes in the subset (steps a-c).
- 25 19. Beacon transmitting method according to claim 18, **wherein** the step of estimating the network dynamics, the estimate of the network dynamics is at least partly based on the path loss history of the beacons received from at least the second radio node in the subset.
- 30 20. Beacon transmitting method according to claim 17, **wherein** the beacon parameters comprise at least one parameter relating to received signal strength of the beacon message, and at least one parameter relating to time of arrival of the beacon messages.

21. Beacon transmitting method according to claim 20, **wherein**, the beacon parameters comprise parameters that have been included by the sending radio node in the beacon message.
- 5 22. Beacon transmitting method according to claim 21, **wherein**, at least one parameter originally included by the sending radio node comprises a parameters relating to the position of the sending node.
- 10 23. A radio node (205) adapted for communication in an ad hoc or multihop network, the radio node comprising and a transmitting part adapted to transmit beacon messages and a receiving part adapted to receive beacon messages, the radio node **characterized in** that the receiving part is arranged to receive, store and process a plurality of beacon messages to determine an estimate of the networks dynamics, and in that the transmitting part is arranged to adjust the rate of which the radio node transmits beacons is based on the estimate of the network dynamics.
- 15 24. Radio node according to claim 23, **wherein** the receiving part comprises:
-beacon recording means (505) for recording a plurality of beacon messages, and determining beacon parameters, the received beacon parameters comprising at least the respective received signal power and time of arrival of the received beacon messages;
-storing means (510) for storing the received beacon parameters;
20 -statistical processing means (515) for performing a statistical analysis on the stored plurality of beacon parameters, whereby producing an estimate of the network dynamics,
and wherein the transmitting part comprises:
-beacon adjusting means (520) for adjusting the transmission rate and/or power of
25 transmitted beacon messages.
25. Radio node according to claim 24, **wherein** the statistical processing means (515) estimates the network dynamics at least partly based on analysis of the relative speed of the at least one other radio node compared to the first radio node.
- 30 26. Radio node according to claim 25, **wherein** the statistical processing means (515) estimates the network dynamics at least partly based on analysis of the relative speed of a plurality of neighbouring radio nodes and wherein the neighbouring radio node

that exhibit the highest relative speed compared to the first radio node, is given the greatest impact on the estimate of the network dynamics.

27. Radio node according to any of claims 23 to 26, **wherein** the beacon receiving means (505) is adapted to define a subset, NB_v , of neighbouring radio nodes, and the storing means (510) is adapted to record and store received beacon parameters from at least a second radio node which is part of the subset.
28. Computer program products directly loadable into the internal memory of a processing means within a radio node (205, 215), comprising the software code means adapted for controlling the steps of any of the claims 12 to 22.
29. Computer program products stored on a computer usable medium, comprising readable program adapted for causing a processing means in a processing unit within at least the first radio node (205, 215), to control an execution of the steps of any of the claims 12 to 22.
30. A system of a plurality of radio nodes (205, 215) adapted to communicate in an ad hoc or multihop network, wherein the radio nodes (205, 215) transmits beacon messages (HELLO messages) between each other, the system **characterised in** that the radio nodes (205, 215) of the system uses the beacon transmitting method according to any of the claims 1 to 11.